

## CLAIMS

What is claimed is:

- 1 1. A method for execution by a microprocessor in response to receiving a single  
2 instruction, the method comprising:  
3 receiving a string of bits;  
4 generating a plurality of indices using a plurality of segments of bits in the  
5 string of bits;  
6 looking up simultaneously a plurality of entries from a plurality of look-up  
7 tables using the plurality of indices; and  
8 combining the plurality of entries into a first result;  
9 wherein the above operations are performed in response to the  
10 microprocessor receiving the single instruction.
- 1 2. A method as in claim 1 further comprising:  
2 receiving a plurality of data elements specifying the plurality of segments in  
3 the string of bits.
- 1 3. A method as in claim 2 wherein the plurality of data elements are received  
2 from an entry in a register file; and wherein the microprocessor is a media  
3 processor integrated with a memory controller on a single integrated circuit.

- 1 4. A method as in claim 3 wherein the single instruction specifies an index of  
2 the entry in the register file.
- 1 5. A method as in claim 2 further comprising:  
2 receiving a bit pointer, wherein the plurality of segments in the string of bits  
3 are determined using the bit pointer and the plurality of data elements.
- 1 6. A method as in claim 5 further comprising:  
2 generating a new bit pointer using the first result.
- 1 7. A method as in claim 1 further comprising:  
2 receiving an offset, wherein the plurality of indices are determined using the  
3 offset and the plurality of segments of bits.
- 1 8. A method as in claim 1 further comprising:  
2 partitioning look-up memory into the plurality of look-up tables before said  
3 looking-up;  
4 wherein the microprocessor is a media processor formed on a monolithic  
5 integrated circuit.
- 1 9. A method as in claim 8 wherein the look-up memory comprises a plurality of  
2 look-up units, and wherein said partitioning look-up memory comprises:

3 configuring the plurality of look-up units into the plurality of look-up tables.

1 10. A method as in claim 23 wherein each of the plurality of look-up units  
2 comprises 256 8-bit entries.

1 11. A method as in claim 1 wherein the single instruction specifies a total  
2 number of entries contained in each of the plurality of look-up tables.

1 12. A method as in claim 11 wherein the total number of entries is one of:  
2 a) 256;  
3 b) 512; and  
4 c) 1024.

1 13. A method as in claim 1 wherein the single instruction specifies a total  
2 number of bits used by each entry contained in the plurality of look-up tables.

1 14. A method as in claim 13 wherein the total number of bits is one of:  
2 a) 8;  
3 b) 16; and  
4 c) 24.

1 15. A method as in claim 8 wherein the plurality of look-up tables are configure  
2 according to an indicator in an entry in a register file.

1 16. A method as in claim 15 wherein the single instruction specifies an index of  
2 the entry in the register file.

1 17. A method as in claim 1 wherein said combining the plurality of entries  
2 comprises:  
3 selecting a valid data from the plurality of entries.

1 18. A method as in claim 17 further comprising:  
2 generating an indicator indicating whether none of the plurality of entries is  
3 valid.

1 19. A method as in claim 17 wherein the valid data is selected according to  
2 priorities of the look-up tables from which the plurality of entries are looked  
3 up.

1 20. A method as in claim 17 wherein said combining the plurality of entries  
2 further comprises:  
3 formatting the valid data according to a type of the valid data.

1 21. A method as in claim 20 wherein the type of the valid data is one of:  
2 a) zero fill;  
3 b) sign magnitude; and

4 c) two complement.

1 22. A method as in claim 21 further comprising:  
2 retrieving a sign bit from the string of bits for the valid data, wherein the first  
3 result is obtained by formatting the valid data using the sign bit when  
4 the type of the valid data is sign magnitude.

1 23. A method as in claim 1 wherein an entry in the plurality of entries contains:  
2 a) information indicating whether the entry is valid;  
3 b) information indicating a type of the entry; and  
4 c) information indicating a number of bits of a code word to be decoded.

1 24. A method as in claim 1 wherein the string is received from an entry in a  
2 register file.

1 25. A method as in claim 24 wherein the single instruction specifies an index of  
2 the entry in the register file.

1 26. A method as in claim 1 further comprising:  
2 receiving a first number indicating a position of a last bit of input in the  
3 string of bit.

1 27. A method as in claim 26 further comprising:

2 generating an indicator indicating whether any bit after the last bit of input is  
3 used in obtaining the first result.

1 28. A method as in claim 12 further comprising:  
2 generating an indicator indicating whether one of the plurality of segments of  
3 bits contains a predetermined code.

1 29. A method as in claim 28 wherein the predetermined code represents an end  
2 of block condition.

1 30. A method as in claim 1 further comprising:  
2 receiving at least one format;  
3 formatting the string of bits into at least one escape data according to the at  
4 least one format; and  
5 combining the at least one escape data and the first result into a second result.

1 31. A method as in claim 30 wherein one of the at least one format is for data of  
2 a type which is one of:  
3 a) zero fill;  
4 b) sign magnitude; and  
5 c) two complement.

1 32. A method as in claim 30 wherein the at least one format is received from an  
2 entry of a register file.

1 33. A method as in claim 32 wherein the single instruction specifies an index of  
2 the entry in the register file.

1 34. A machine readable media containing an executable computer program  
2 instruction which when executed by a digital processing system causes said  
3 system to perform a method comprising:  
4 receiving a string of bits;  
5 generating a plurality of indices using a plurality of segments of bits in the  
6 string of bits;  
7 looking up simultaneously a plurality of entries from a plurality of look-up  
8 tables using the plurality of indices; and  
9 combining the plurality of entries into a first result;  
10 wherein the above operations are performed in response to the  
11 microprocessor receiving the single instruction.

1 35. A media as in claim 34 wherein the method further comprises:  
2 receiving a plurality of data elements specifying the plurality of segments in  
3 the string of bits.

- 1 36. A media as in claim 35 wherein the plurality of data elements are received  
2 from an entry in a register file.
- 1 37. A media as in claim 36 wherein the single instruction specifies an index of  
2 the entry in the register file.
- 1 38. A media as in claim 35 wherein the method further comprises:  
2 receiving a bit pointer, wherein the plurality of segments in the string of bits  
3 are determined using the bit pointer and the plurality of data elements.
- 1 39. A media as in claim 38 wherein the method further comprises:  
2 generating a new bit pointer using the first result.
- 1 40. A media as in claim 34 wherein the method further comprises:  
2 receiving an offset, wherein the plurality of indices are determined using the  
3 offset and the plurality of segments of bits.
- 1 41. A media as in claim 34 wherein the method further comprises:  
2 partitioning look-up memory into the plurality of look-up tables before said  
3 looking-up.



1 42. A media as in claim 41 wherein the look-up memory comprises a plurality of  
2 look-up units, and wherein said partitioning look-up memory comprises:  
3 configuring the plurality of look-up units into the plurality of look-up tables.

1 43. A media as in claim 56 wherein each of the plurality of look-up units  
2 comprises 256 8-bit entries.

1 44. A media as in claim 34 wherein the single instruction specifies a total  
2 number of entries contained in each of the plurality of look-up tables.

1 45. A media as in claim 44 wherein the total number of entries is one of:  
2 a) 256;  
3 b) 512; and  
4 c) 1024.

1 46. A media as in claim 34 wherein the single instruction specifies a total  
2 number of bits used by each entry contained in the plurality of look-up tables.

1 47. A media as in claim 46 wherein the total number of bits is one of:  
2 a) 8;  
3 b) 16; and  
4 c) 24.

1 48. A media as in claim 41 wherein the plurality of look-up tables are configure  
2 according to an indicator in an entry in a register file.

1 49. A media as in claim 48 wherein the single instruction specifies an index of  
2 the entry in the register file.

1 50. A media as in claim 34 wherein said combining the plurality of entries  
2 comprises:  
3 selecting a valid data from the plurality of entries.

1 51. A media as in claim 50 wherein the method further comprises:  
2 generating an indicator indicating whether none of the plurality of entries is  
3 valid.

1 52. A media as in claim 50 wherein the valid data is selected according to  
2 priorities of the look-up tables from which the plurality of entries are looked  
3 up.

1 53. A media as in claim 50 wherein said combining the plurality of entries  
2 further comprises:  
3 formatting the valid data according to a type of the valid data.

1 54. A media as in claim 53 wherein the type of the valid data is one of:

2 a) zero fill;

3 b) sign magnitude; and

4 c) two complement.

1 55. A media as in claim 54 wherein the method further comprises:

2 retrieving a sign bit from the string of bits for the valid data, wherein the first

3 result is obtained by formatting the valid data using the sign bit when

4 the type of the valid data is sign magnitude.

1 56. A media as in claim 34 wherein an entry in the plurality of entries contains:

2 a) information indicating whether the entry is valid;

3 b) information indicating a type of the entry; and

4 c) information indicating a number of bits of a code word to be decoded.

1 57. A media as in claim 34 wherein the string is received from an entry in a

2 register file.

1 58. A media as in claim 57 wherein the single instruction specifies an index of

2 the entry in the register file.

1 59. A media as in claim 34 wherein the method further comprises:

2 receiving a first number indicating a position of a last bit of input in the  
3 string of bit.

1 60. A media as in claim 59 wherein the method further comprises:  
2 generating an indicator indicating whether any bit after the last bit of input is  
3 used in obtaining the first result.

1 61. A media as in claim 45 wherein the method further comprises:  
2 generating an indicator indicating whether one of the plurality of segments of  
3 bits contains a predetermined code.

1 62. A media as in claim 61 wherein the predetermined code represents an end of  
2 block condition.

1 63. A media as in claim 34 wherein the method further comprises:  
2 receiving at least one format;  
3 formatting the string of bits into at least one escape data according to the at  
4 least one format; and  
5 combining the at least one escape data and the first result into a second result.

1 64. A media as in claim 63 wherein one of the at least one format is for data of a  
2 type which is one of:  
3 a) zero fill;

- 4           b) sign magnitude; and
- 5           c) two complement.

1   65.    A media as in claim 63 wherein the at least one format is received from an  
2           entry of a register file.

1   66.    A media as in claim 65 wherein the single instruction specifies an index of  
2           the entry in the register file.